CLAIMS

What is claimed is:

1.	A method of controlling an amount of discrete cosine transform (DCT) computation of motion image encoding, the method comprising:

receiving decoder complexity information that represents an amount of decoding computation performed on previous image data; and

controlling a skipping of DCT operations on current image data based on the received decoder complexity information.

2.	The method of claim 1, wherein the receiving decoder complexity information further comprises calculating the decoder complexity information which represents the amount of decoding computation performed on previous image data.

3.	The method of claim 1, wherein the controlling of the skipping of DCT operations comprises:

calculating a target DCT computation amount for the current image data using the received decoder complexity information;

calculating a threshold value used to skip execution of a DCT on the current image data, based on the calculated target DCT computation amount; and

controlling the skipping of DCT operations on the current image data, depending on the calculated threshold value.

4.	The method of claim 1, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

5.	The method of claim 4, wherein the decoder complexity information further includes information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

6.	The method of claim 1, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

7. The method of claim 1, wherein a DCT operation on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

8. The method of claim 3, wherein a threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1 + \frac{C_n - C_t}{aC_t})$$

wherein a denotes a parameter to control a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes the amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount of the current image data.

9. The method of claim 3, wherein the controlling of the skipping of DCT operations further comprises skipping a DCT if the calculated threshold value is smaller than SAD/Q and performing a DCT if the calculated threshold value is greater than SAD/Q, wherein the sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

10. A method of controlling the amount of DCT computation of motion image encoding, the method comprising:
    receiving both decoder complexity information that represents an amount of a decoding computation on previous image data and ME computation amount variation information that represents information on a variation in an amount of a motion estimation (ME) computation; and
    controlling the skipping of DCT operations on current image data based on the received decoder complexity information and the received ME computation amount variation information.

11. The method of claim 10, wherein the information receiving operation further comprises calculating the decoder complexity information that represents the amount of decoding computation on previous image data.

12.   The method of claim 10, wherein the ME computation amount variation information is a difference between a target ME computation amount for the current image data and the amount of the ME computation actually performed on the previous image data.

13.   The method of claim 10, wherein the controlling of the skipping of DCT operations comprises:
        calculating a target DCT computation amount for the current image data using the received decoder complexity information and the received ME computation amount variation information;
        calculating a threshold value used to skip execution of an DCT on the current image data, based on the calculated target DCT computation amount; and
        controlling the skipping of DCT operations on the current image data, depending on the calculated threshold value.

14.   The method of claim 10, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

15.   The method of claim 12, wherein the decoder complexity information further includes information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

16.   The method of claim 10, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

17.   The method of claim 10, wherein a DCT on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

18.   The method of claim 11, wherein the threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1+\frac{C_n - C_t}{aC_t})$$

wherein a denotes a parameter to control a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes the amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount for the current image data.

19.   The method of claim 11, wherein controlling the skipping of DCT operations further comprises skipping a DCT if the calculated threshold value is smaller than SAD/Q and performing a DCT if the calculated threshold value is greater than SAD/Q, wherein a sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

20.   An apparatus to control an amount of a discrete cosine transform (DCT) computation of motion image encoding, the apparatus comprising:
        a DCT computation amount controller controlling a skipping of DCT operations on current image data using decoder complexity information which represents an amount of decoding computation on input previous image data; and
        a DCT unit performing a DCT operation or skipping execution of a DCT operation on the input present image data based on a control signal output from the DCT computation amount controller.

21.   The apparatus of claim 20, further comprising a decoder complexity calculator calculating the decoder complexity information that represents the amount of a decoding computation on input previous image data.

22.   The apparatus of claim 20, wherein the DCT computation amount controller calculates a target DCT computation amount of the current image data using the decoder complexity information, calculates a threshold value used to skip execution of an DCT operation on the current image data, based on the calculated target DCT computation amount, and controls the skipping of DCT operations on the current image data depending on the calculated threshold value.

23.   The apparatus of claim 20, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

24.   The apparatus of claim 22, wherein the decoder complexity information further comprises information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

25.   The apparatus of claim 20, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

26.   The apparatus of claim 20, wherein a DCT operation on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

27.   The apparatus of claim 22, wherein a threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1+\frac{C_n - C_t}{aC_t})$$

wherein a denotes a parameter for controlling a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes the amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount for the current image data.

28.   The apparatus of claim 22, wherein the DCT computation amount controller further skips a DCT if the calculated threshold value is smaller than SAD/Q and performs a DCT if the calculated threshold value is greater than SAD/Q, wherein a sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

29.   An apparatus to control an amount of a DCT computation of motion image encoding, the apparatus comprising:

a DCT computation amount controller controlling a skipping of DCT operations on current image data using both decoder complexity information which represents an amount of decoding computation on previous image data and ME computation amount variation information which represents information on a variation in an amount of motion estimation (ME) computation; and

a DCT transformer performing a DCT operation or skipping execution of a DCT operation on input present image data based on a control signal output from the DCT computation amount controller.

30.   The apparatus of claim 29, further comprising a decoder complexity calculator calculating the decoder complexity information that represents the amount of a decoding computation on input previous image data.

31.   The apparatus of claim 29, wherein the ME computation amount variation information is a difference between a target ME computation amount for the current image data and the amount of an ME computation actually performed on the previous image data.

32.   The apparatus of claim 29, wherein the DCT computation amount controller calculates a target DCT computation amount for the current image data using the decoder complexity information and the ME computation amount variation information, calculates a threshold value used to skip execution of an DCT operation on the current image data, based on the calculated target DCT computation amount, and controls the skipping of DCT operations on the current image data depending on the calculated threshold value.

33.   The apparatus of claim 29, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

34.   The apparatus of claim 33, wherein the decoder complexity information further includes information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

35.   The apparatus of claim 29, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

36.   The apparatus of claim 29, wherein a DCT on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

37.   The apparatus of claim 32, wherein the threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1+\frac{C_n - C_t}{aC_t})$$

wherein a denotes a parameter to control a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes an amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount for the current image data.

38.   The apparatus of claim 32, wherein the DCT computation amount controller further skips a DCT if the calculated threshold value is smaller than SAD/Q and performs a DCT if the calculated threshold value is greater than SAD/Q, wherein a sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

39.   A computer readable medium having computer-executable instructions to control an amount of discrete cosine transform (DCT) computation of motion image encoding, the computer-executable instructions comprising:
       receiving decoder complexity information that represents an amount of decoding computation performed on previous image data; and
       controlling a skipping of DCT operations on current image data based on the received decoder complexity information.

40.   The computer readable medium of claim 39, wherein the receiving decoder complexity information further comprises calculating the decoder complexity information which represents the amount of decoding computation performed on previous image data.

41.   The computer readable medium of claim 39, wherein the controlling of the skipping of DCT operations comprises:

calculating a target DCT computation amount for the current image data using the received decoder complexity information;

calculating a threshold value used to skip execution of a DCT on the current image data, based on the calculated target DCT computation amount; and

controlling the skipping of DCT operations on the current image data, depending on the calculated threshold value.

42.   The computer readable medium of claim 39, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

43.   The computer readable medium of claim 42, wherein the decoder complexity information further includes information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

44.   The computer readable medium of claim 39, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

45.   The computer readable medium of claim 39, wherein a DCT operation on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

46.   The computer readable medium of claim 41, wherein a threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1 + \frac{C_n - C_t}{aC_t})$$

wherein a denotes a parameter to control a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes the amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount of the current image data.

47. The computer readable medium of claim 41, wherein controlling the skipping of DCT operations further comprises skipping a DCT if the calculated threshold value is smaller than SAD/Q and performing a DCT if the calculated threshold value is greater than SAD/Q, wherein the sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

48. A computer readable medium having computer-executable instructions to control an amount of discrete cosine transform (DCT) computation of motion image encoding, the computer-executable instructions comprising:

receiving both decoder complexity information that represents an amount of a decoding computation on previous image data and ME computation amount variation information that represents information on a variation in an amount of a motion estimation (ME) computation; and

controlling the skipping of DCT operations on current image data based on the received decoder complexity information and the received ME computation amount variation information.

49. The computer readable medium of claim 48, wherein the information receiving operation further comprises calculating the decoder complexity information that represents the amount of decoding computation on previous image data.

50. The computer readable medium of claim 48, wherein the ME computation amount variation information is a difference between a target ME computation amount for the current image data and the amount of the ME computation actually performed on the previous image data.

51. The computer readable medium of claim 48, wherein the controlling of the skipping of DCT operations comprises:

calculating a target DCT computation amount for the current image data using the received decoder complexity information and the received ME computation amount variation information;

calculating a threshold value used to skip execution of an DCT on the current image data, based on the calculated target DCT computation amount; and

controlling the skipping of DCT operations on the current image data, depending on the calculated threshold value.

52. The computer readable medium of claim 48, wherein the decoder complexity information includes information on a decoder computation amount allowed for the previous image data and information on a decoder computation amount actually consumed for the previous image data.

53. The computer readable medium of claim 52, wherein the decoder complexity information further includes information on a ratio of an amount of processing of an inverse discrete cosine transform (IDCT) computation to a total amount of processing of computation required to decode the previous image data.

54. The computer readable medium of claim 48, wherein the previous image data are a predetermined number of previous frames, and the current image data is a frame being currently encoded.

55. The computer readable medium of claim 48, wherein a DCT on the current image data is executed or skipped in the currently-encoded frame on a block-by-block basis.

56. The computer readable medium of claim 49, wherein the threshold value T_{n+1} of the current image data is determined using the following equation:

$$T_{n+1} = T_n \frac{Q_n}{Q_{n+1}} (1 + \frac{C_n - C_t}{aC_t})$$

wherein α denotes a parameter to control a convergent speed, T_n denotes a threshold value of the previous image data, Q_n denotes a quantization coefficient of the previous image data, Q_{n+1} denotes a quantization coefficient of the current image data, C_n denotes the amount of a DCT computation performed on the previous image data, and C_t denotes a target DCT computation amount for the current image data.

57.   The computer readable medium of claim 49, wherein controlling the skipping of DCT operations further comprises skipping a DCT if the calculated threshold value is smaller than SAD/Q and performing a DCT if the calculated threshold value is greater than SAD/Q, wherein a sum of absolute difference (SAD) denotes a block matching error and the Q denotes a quantization coefficient of the current image data being encoded.

58.   A method of controlling an amount of discrete cosine transform (DCT) computation of motion image encoding, the method comprising:

applying a variation in an amount of motion estimation computation by a motion estimation unit to a DCT unit, wherein a computation complexity of a motion image encoder is kept substantially constant regardless of characteristics of images.